

“dura-kut”



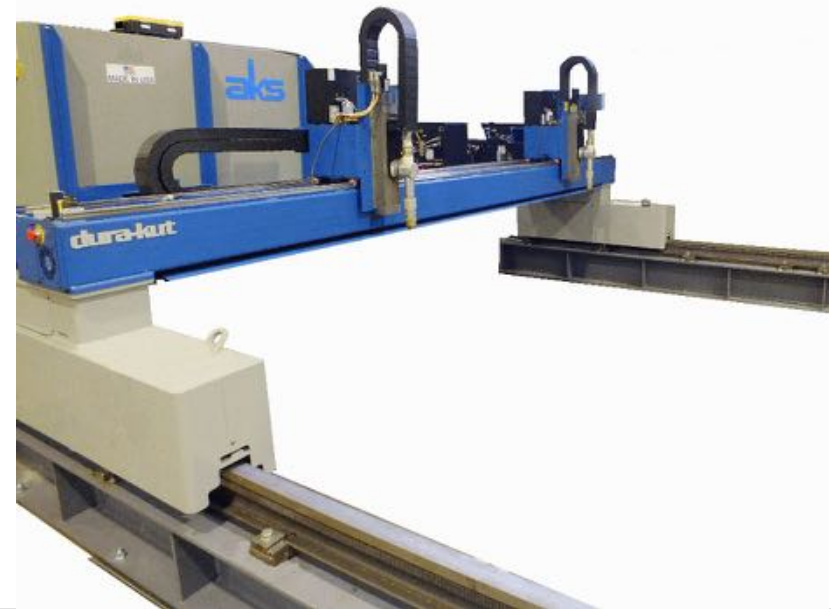
A TRADITION IN EXCELLENCE

AKS “dura-kut”

Most Trusted Name in Precision Plasma Cutting

The AKS “dura-kut”:

- **traditional “gantry” style system** with independent table and machine frame, suitable for **larger & thicker plate** cutting
- combines the best of **Hypertherm SureCut™ (Full Suite)** plasma technology with over **100 years of AKS** superior machine experience
- **heavy-duty** style cutting using **HyDefinition plasma torch** and **optional oxy-fuel torches**
- offers unique, patented features like **“robo-kut”**, **“tube-kut”** and more

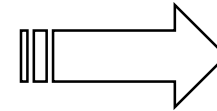


Plasma Cutting Components

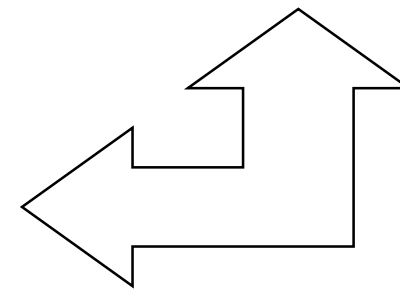
Electrical Power



Plasma Supply Unit



CNC Control



Machine Table

“dura-kut” Features

Y-Axis Helical Rack & Pinion Drive System
Heavy Duty Gantry Bridge

Optional “robo-kut”
5-axis Bevel Head

Hy-Def Plasma Torch

Optional Oxy-Fuel Torches

Hypertherm Edge Connect
CNC Controller

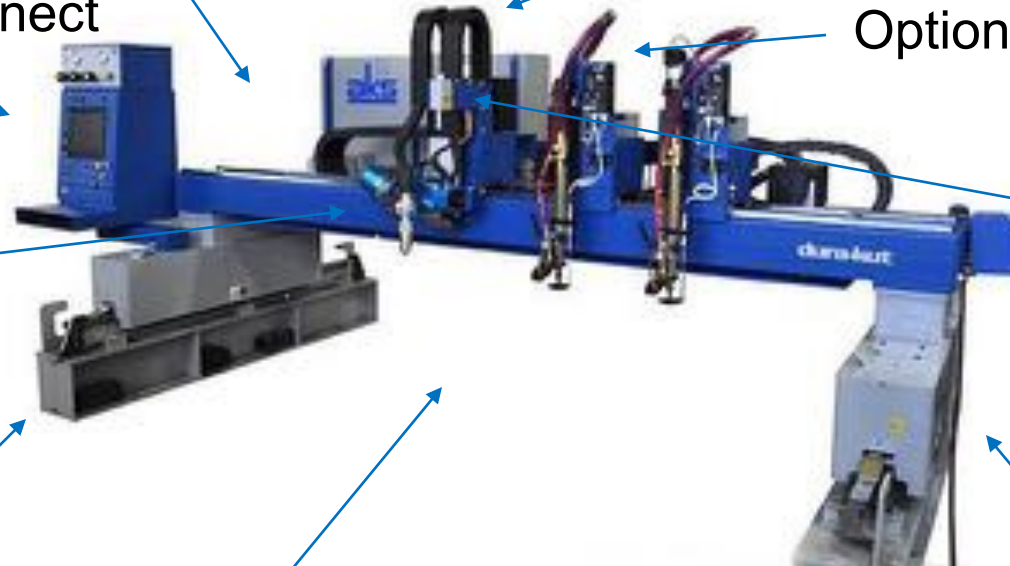
Laser Pointer

Magnetic
Breakaway Head

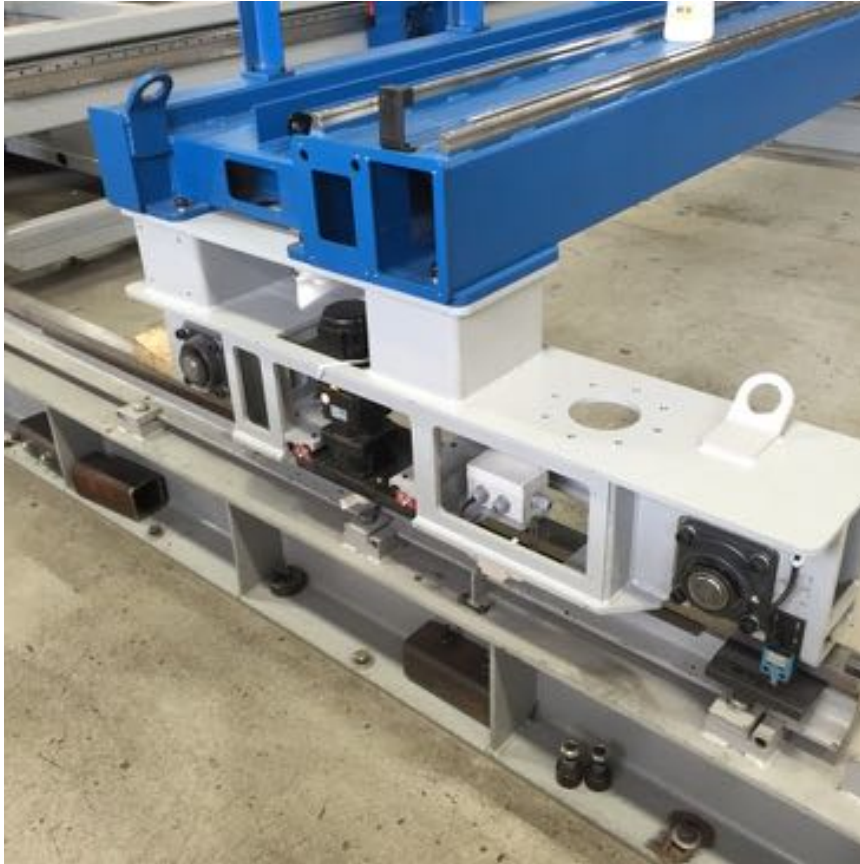
H-Beam Supports

Independent Tank/Table
Options Available

X-Axis Rack & Pinion Drive System
Heavy Duty Crane Rail



“dura-kut” X-axis Construction



- **Heavy-duty**, fully welded, 3/8” thick steel “**truck**” structure provides **superior rigidity and stability**
- All mounting surfaces machined in **ONE SET-UP** for **premium accuracy** and precision
- Uses a **LH and RH “truck”** with each welded frame structure consisting of a **drive motor, coupler, reducer and pinion** with **dual bearing units** for front and rear alignment
- “**trucks**” are completely enclosed with **removable cover panels** for easy maintenance

“dura-kut” X-axis Construction



- **Heavy-Duty 105-lb Crane Rail** is precision machined, and then mounted to **H-Beam Supports** with cleats for the entire length of machine
- the **Rail** is mounted with precise adjustability both up/down and left/right
- the **Rack** is mounted to underside of precision machined **Rail** for best **protection** from harsh environment

“dura-kut” X-axis Construction



- Pinion is **precision located and mated** to rail **without need for spring or pneumatic load**, thus providing **highest accuracy and minimizing wear**
- includes **Brass Wiper Blade** to clear debris from **Rail** surface
- **Modular Rail Extensions** can extend length in **10' sections**, and is essentially limitless

“dura-kut” Y-axis Bridge Design

- **Heavy-duty Y-axis machined Bridge Beam** allows accurate and precise movement and rigidity
- Steel weldment machined frame
- Dual **Precision Guide Rails** mounted on top surface of bridge
- the **Rack** is “**tucked under**” Rail for protection
- **Heat protection shields** designed to prevent high temp damage to bridge and components
- **Standard** lengths in **2ft increments** from 8ft wide to 24ft wide

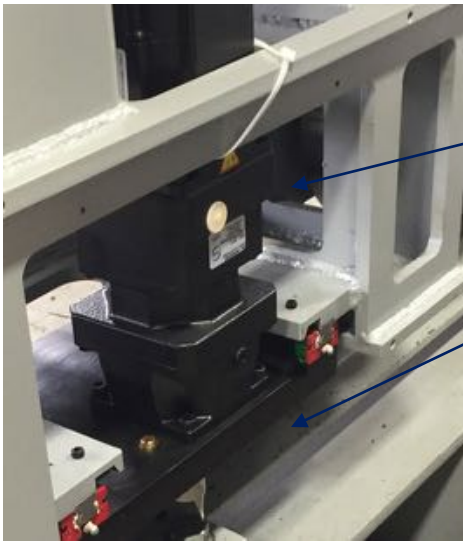


“dura-kut” Y-axis Bridge Design



- **Y-axis bridge is mounting area** for CNC controller console, auto gas control system, cat track and z-axis lifter carriages
- **Y-axis bridge offers extra length to:**
 - mount **additional plasma or oxy-fuel torches**
 - mount **“robo-kut” Bevel Head**
 - have **extra walking room** around table
- **LH side Y-axis bridge is mounting location** for **CNC Controller Unit - Hypertherm Edge Connect**

“dura-kut” Rack & Pinion Drives



Servo Motor

Rack & Pinion

Rails & Bearings



- **High Quality, High Precision & High Accuracy** Drive Components
- Precision Ground **Rack and Pinion** for **both X-axis and Y-axis** for low backlash and high positioning accuracy. Pinion is **precision located and mated** to helical rail **without need** for **spring or pneumatic load**, thus providing **highest accuracy and minimizing wear**
- Superior **Linear Rail Guides** provide unparalleled smooth & accurate motion
- Servo Motor/Gearbox provide quick acc/dec and high traverse speeds

Water Table/Tank



- The **Water Table/Tank** is **independent** and **separate** from the gantry
- Includes complete steel structure and **removable/replaceable steel slats**
- **Table/Tank** is either provided by **AKS Cutting Systems**, a third party regional Table manufacturer, or customer self-fabrication
- **Removable Scrap Pans** are optionally available and easy to clean and keep table in production
- Offers **Water Level Raise/Lower Control**

Air Down Draft Table



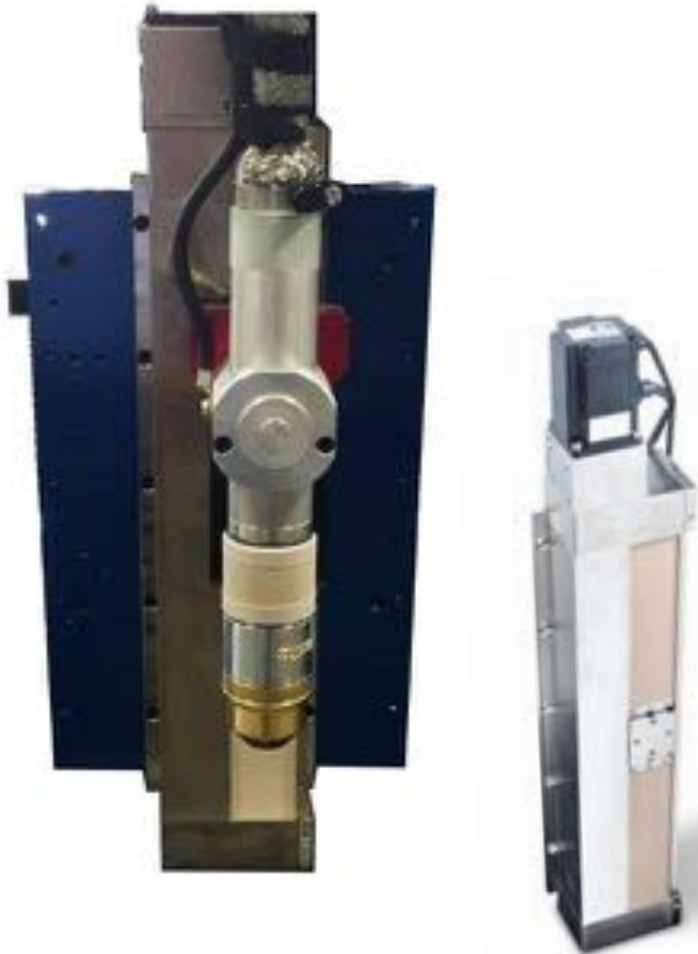
- All **Down Draft Tables** are **independent** and **separate** from the gantry
- Includes complete steel structure, including steel floor and **removable/replaceable steel slats**
- **Removable Scrap Pans** are optionally available and easy to clean, lifted out with lift eyes, and keeps table in production
- Optional Smoke Collector System and single or double exhaust ducts
- Down Draft Tables include multiple 2.5 ft or 5' zones, controlled through gantry contact switches or pneumatically actuated soft-switches

“Self Cleaning” Down Draft Table



- **Scraper system is chain driven** and travels **the length of table** to automatically **sweep out excess slag**, scrap, waste and even small parts
- **Scraper system** is pulled up ramp to **dump slag into slag pan** and then lifts on return stroke, so **all slag is pushed forward** and not pushed away from exit
- **Slag collection pans** can roll in/out, under drive unit cabinet, for **easy dumping**, requiring **no pits or holes** cut into floor
- **Automatic zone operation** with 5' zones with manual or pneumatic zone doors
- Table capacity up to 3", 6", or 8" steel thicknesses
- **1/4" floor** protects concrete from pitting & scaring - **perfect for uneven floors**

THC – Torch Height Control



- Automatic **Servo-Controlled Arc Voltage Management System** to optimize torch height stand-off above plate material
- **Sensor™ THC** increases productivity due to faster response, shorter pre-flow times, programmable re-tract heights and tighter integration with CNC
- Ohmic contact and stall-force **Initial Height Sense**
- Built-in keyed **Magnetic Breakaway Bracket** to protect from crash

Magnetic Breakaway Head

- **Fully-Machined Tethered and Keyed** design which triggers “fast stop”, upon disconnection from crash, collision or tip-up events
- **Protects against damage** of torch hardware from crash
- Ensures safe operation
- Easy **consumable changeouts**
- Fast, easy and repeatable manual **re-connection** via guide pin keyed magnetic mounting block



Normal



Crashed

Laser Pointer



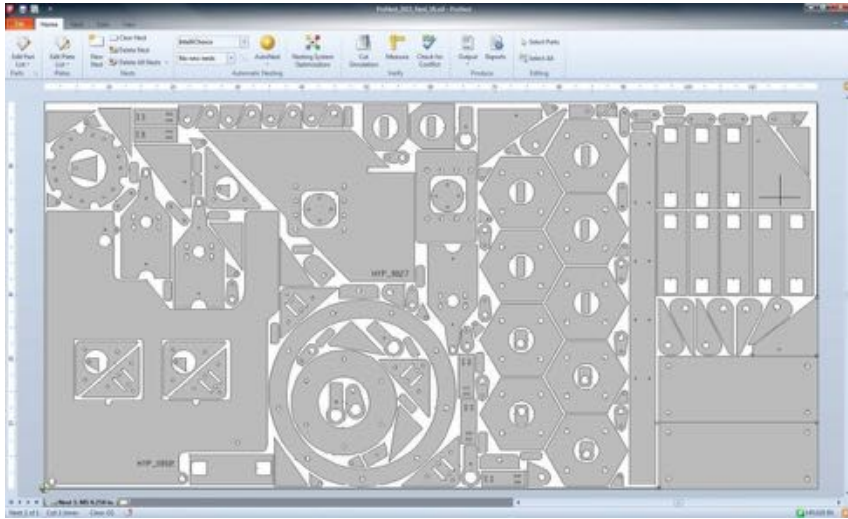
- **Standard Feature** included on all AKS plasma machines
- Bright red “**crosshairs**” style laser projection for operator to manually **align** the cutting head to exact **location** on the plate
- Laser unit located above/out-of-the-way from the harsh, high heat, and debris/splatter environment at torch
- **Toggle Control** at operator panel
- **Automatic Offset** calculation

Hypertherm Edge Pro CNC Control



- **True “industrial” CNC** control, not PC, for most reliable operation and fastest processing
- **Gantry Side-Mounted** for convenient location
- **Windows** based Operating System
- Operating **Hypertherm Phoenix™ Software**
- Import DXF, DWG and 2D-IGES file formats
- Ethernet capable **Networking** and **USB** access for part program loading and software updates
- Uses Hypertherm’s patented **CutPro™ Wizard**
- **Remote Help™** quickly provides diagnostic information at the CNC to enable diagnosis and repair over the internet reducing the need for on-site visits
- Optional **Hand Pendent Remote Control**

Hypertherm Pro Nest 2017 Software



- **Hypertherm Programming and Nesting CAD/CAM Software Package** specifically designed to:

- ✓ increase material savings
- ✓ boost productivity
- ✓ lower operating costs
- ✓ improve part quality

Hypertherm Pro Nest 2017 Software

- Pro Nest automatically embeds **SureCut™ cut process expertise** and creates the NC code, including material type, thickness, or grade, and delivers the optimal adjustments **for leads, separations (for part, plate and pierce spacing), kerf, feedrate, and cutting techniques**
- Includes Hypertherm **SureCut™** breakthrough technologies like **True Hole®**, **True Bevel™** and **Rapid Part™**, delivered automatically without operator intervention, greatly reducing programming & set up time, and increasing consumable life



ProNest®

Nesting Software | 2015

Hypertherm Pro Nest 2017 Software

- Features:

- Automatic and Manual Nest Sequencing
- Graining constraint
- Edge Pierce Technology
- Automatic Tabbings/Micro-Joints
- Safe zones for plate clamping applications
- Multi-head cutting – including :
 - automatic head selection
 - variable torch spacing

Hypertherm



- Job Set-Up:

- Material database (with grade and gauge)
- Customer database and plate list
- Custom remnant creation (define irregular shapes for nesting)
- “Variable Shape Parts” library

Hypertherm Pro Nest 2017 Software

- Nesting:

- Sheets with multiple material types, thicknesses, and classes per job
- Group parts into clusters for nesting
- Drag, drop and bump parts on the nest
- Move, mirror, rotate, or array parts
- Prohibit/permit nesting inside of a part
- Part interference detection
- Edit lead-in/out position and properties
- Animated cutting sequence simulation
- Control cut direction and cut sequencing on part-by-part basis
- Plate Cropping

Hypertherm



- Reporting:

- Management, Production and Shop reports
- Export reports directly to PDF, Excel Spreadsheet, CSV, or webpage

Hypertherm Pro Nest 2017 Software

- Costing and Quoting:
 - User-defined machine and labor production costing
 - Automatic calculation of part production costs and part/nest utilization
 - Quoting tool including itemized part costs, secondary processes, markups, and discounts
- Output
 - OneClick™ feature runs all of the most common job tasks from Automatic Nesting to output and more
 - Post-processor with NC output
 - Automatic kerf/pre-kerf compensation
 - DXF output

Hypertherm



Hypertherm “SureCut™”

“Maximizing Performance Through Embedded Expertise”



Outcomes/Techniques

- True Hole®
- True Bevel™
- Rapid Part™
- Optimized Consumable Life



Setup/Diagnostics

- Easy Setup
- Optimized Process Parameters
- Easy Troubleshooting

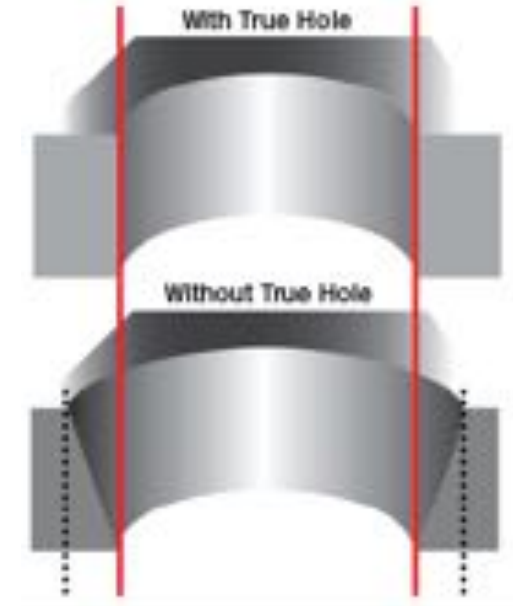
Hypertherm “True Hole®”



With True Hole® technology



With out True Hole® technology



- **Revolutionary Plasma Performance:**

“Patented True Hole® Technology Cut Quality is Part of Hypertherm's **SureCut™** (Full-Suite) Technology Package”

Hypertherm “True Hole®” (cont’d)

- **True Hole®** for mild steel **exclusively** available with :
 - ✓ Hypertherm's **Hy-Performance® HPRXD®**
 - ✓ Auto Gas Console Control System
 - ✓ **True Hole® “Enabled”** cutting machine
- **True Hole® “Enabled”** requires the machine to meet Hypertherm pre-determined **performance specifications**
- **True Hole® Technology** is **automatically** active without operator intervention and applied to right-sized holes with correct diameter-to-thickness ratios, **based on settings**
- **True Hole® Technology** narrows the gap with laser hole quality, making the plasma process suitable for many jobs previously cut with laser

Hypertherm “True Hole®” (cont’d)

- **True Hole® Technology** is a specific combination of specific parameters automatically linked to a **material type, material thickness, given amperage, and hole size**:
 - Process Gas Type and Gas Flow
 - Amperage
 - Piercing Methodology and Lead In/Out Technique
 - Cut Speed
 - Reduced Timing to Optimize Hole Features
- **True Hole® Technology** provides:
 - Virtual elimination of hole taper
 - Ding reduced and biased to the outside of the hole
 - **True "bolt-hole" quality**

Hypertherm “Rapid Part™”



Rapid Part™ Technology increases the number of parts produced per hour by up to 100%

Note: Cut-to-cut cycle time improvement is apparent on all jobs, with the most significant improvements achieved on nests using thin plate with a high part / pierce count.

Rapid Part™ Technology enhances productivity by **reducing cut-to-cut cycle time**, that is, the time the arc is off, from the time from the last cut (or pierce) to the next pierce, typically including:

1. Torch Retract

Rapid z-axis “retract” motion using the intelligent Sensor THC to the next pierce height, based on material /part properties

2. Table Motion

Optimized x-y motion programmed using ProNest with Collision Avoidance module, which minimizes chances of torch collision and the distance from the end of one cut and the pierce on the next cut.

3. Initial Height Sensing

Rapid z-axis “down” motion using the intelligent Sensor THC with automatic fast-to-slow speed crossover calibration. IHS skipped intelligently, based on part geometry and nest configuration

4. Gas Pre-Flow

Completed simultaneously during initial height sensing and /or during machine motion if IHS is skipped.

Hypertherm Plasma Supply Units



- **Hypertherm “Hy-Definition” HyPerformance Plasma** is the **industry standard** plasma power supply unit with auto gas control, plasma torch unit and leads
- **HyPerformance Plasma** cuts fine-featured parts with superior quality and consistency, virtually eliminating secondary operations
- Base package comes standard with Hypertherm **HPR130XD** with **Optional Upgrades** to **HPR260XD, HPR400XD or HPR800XD**

OPTIONAL – “robo-kut”



- **AKS “robo-kut”** is the leading **5-axis bevel head** in the plasma cutting industry
- Protected by several **AKS patents**
- Allows for **+/-45 degrees** cutting for **A, V, K, X, top & bottom-Y style bevel** cuts
- Designed with **robotic style precision gearing** that can be incremented in arc-seconds, or fractions of degrees, for tightest precision and accuracy
- Machined from **solid billet aluminum block** without using weldments or stamped parts like competitive cutting heads.
- Robust, rigid and solid design **sealed for protection and cleanliness**

OPTIONAL – “robo-kut” (cont’d)

- Includes **Magnetic Breakaway Head** to prevent damage upon crash
- Includes Hypertherm “**Bevel Machine Interface, “Bevel Machine Post Processor,”** and Hypertherm “**True Bevel”** Software modules
- **Unlimited Wind-Up** – allows Continuous Rotation if necessary
- **Patented Automatic Calibration** Routine which insures repeatability
- THC automatically sets torch height
- Includes AKS **Advanced Bevel Training**



OPTIONAL – “robo-kut” (cont’d)

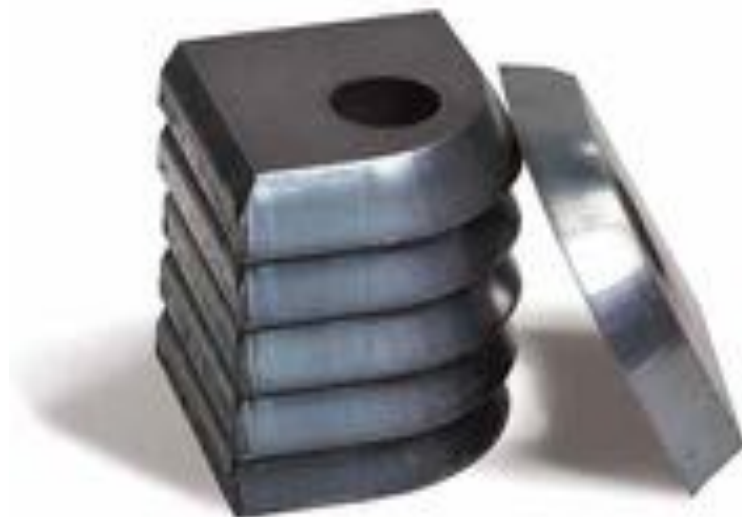


- **MOST IMPORTANT:**

- Produces ½” dia “**bolt ready holes**” in 1” thick steel plate
- **AKS “robo-kut”** offers ½” : 1 ” ratio for **hole diameter : thickness** in many applications, **superior than competitive** machines which are limited to traditional 1” : 1” ratio

Hypertherm “True Bevel™”

- **True Bevel™ Technology** for HPRXD® on mild steel applications is **automatically implemented**, taking the guesswork out of the plasma bevel cutting process.
- With **True Bevel™**, setups for new jobs are quick and easy, results are accurate, and **scrap is greatly reduced**
- Exact bevel cut **sequence** is programmed for **accuracy and consistent** quality
- Scalable parameter tables with embedded equations allow users to **add new angles with ease**
- With **AKS “robo-kut”**, can **produce A, V, K, X** and top & bottom-Y style bevel cuts



Hypertherm “True Bevel” (cont’d)

- **True Bevel™ Technology** process parameter tables contain values for **cut angles ranging from 15° to 45°**
- **True Bevel™ Technology** process parameter tables contain values for **lands ranging from 20% to 50% of the material thickness**
- **Custom angles and land dimensions** are able to be programmed into the process parameter tables for more flexibility
- Tables automatically provide **newly calculated output values** for **angle compensation, kerf, cut height, cut speed, and arc voltage**



Hypertherm “True Bevel” (cont’d)



WITHOUT True Bevel™

- These **three** parts were **setup iterations** during field testing using a non **True Bevel™** method that took more than 1 hour to complete.
- At least one further iteration would be required to obtain an acceptable part.

WITH True Bevel™

- This **single** part was achieved on the first try using **True Bevel™ Technology** and is an acceptable part ready to start production.

OPTIONAL – Oxy-Fuel Torch Heads

- *Optional* oxy-fuel torches for **cutting thick mild steel up to 8” maximum thickness**
- Includes gas hoses, regulators and manifold
- **Separate independent servo controlled carriage** with separate manual height control
- **Multiple** oxy-fuel torches available on slaved carriages
- “dura-kut” offers combined plasma and/or oxy-fuel cutting capability
- Automatic Remote Gas Control & Remote Torch Ignition



OPTIONAL Smoke Collector

- *Optional* Air Pollution Control (APC) unit to **collect and extract fumes & smoke**
- Improves worker safety & environment and helps protect sensitive equipment
- ***Optional* on Air Down Draft Table Systems**
- **Environmentally Preferred** over Water Table Systems
- Replaceable Filter Cartridge units



OPTIONAL “tube-kut”



- **2' wide** processing area
- Up to **20ft long** tube or pipe
- Up to **12”x 12”** standard rectangular or square tube
- Up to **24”** OD round pipe
- Servo-controlled **rotary headstock** with **manual clamping** system
- Servo-controlled torch height control
- Servo-controlled miter axis with +/- 45° tilt range – requires **AKS “robo-kut”** bevel head
- Includes separate **Rotary Tube Pro Software** Requires **Hypertherm ProNest 2017**

OPTIONAL “tube-kut”



Tube & Pipe Support Units

- **Quantity – two (2)** support units included with optional additional support units available
- **Rolling spacing capability** along length of machine while **guided independently** along machined plate alignment
- Requires **specific tooling** to hold different tube or pipe sizes

Large Machine Capabilities



- **“dura-kut” standard** available widths: 8’, 10’, 12’, 14’, 16’, 18’
- **“dura-kut” heavy-duty** available widths: 20’, 22’, 24’
- **“dura-kut”** available lengths: 20’, 30’, 40’, 50’, in 10’ increments up to 200’
- **Modular** Frame Design for Extended Lengths (all Helical Rack & Pinion Drive for both axes)
- **Modular** Tank/Table Design for Extended Lengths (water or down draft)
- Single or **Multiple Plasma Heads** and/or **Multiple Oxy-Fuel Torches**

Plasma Cutting Examples



1" Mild Steel with 1/2" Bolt Holes

- **Material** – Mild Steel
- **Thickness** – 1.0"
- **Part Size** - 8" x 8"
- **(3) Bolt Holes** – 1/2" dia
 - Utilizing AKS "robo-kut" Bevel Head
- **All Edges Beveled**
 - Utilizing True Bevel™
- **Plasma Supply** – HPR400XD
- **Current** – 400 amps
- **Cut Rate** – 85"/min
- **Cut Time** – 74 sec



2" Thick Mild Steel

- **Thickness** – 2.0"
- **Plasma Supply** – HPR400XD
- **Current** – 400 amps
- **Cut Rate** – 30"/min
- **Cut Time** – 98 sec



1 1/4" Mild Steel with 45° Bevel

- **Thickness** – 1.25"
- **Plasma Supply** – HPR400XD
- **Current** – 400 amps
- **Cut Rate** – 65"/min
- **Cut Time** – 42 sec
- **3/4" Bolt Hole**
 - Utilizing AKS "robo-kut" Bevel Head
- **45° Bevel Cut** – complete perimeter
 - Utilizing True Bevel™



1/2" Mild Steel

- **Thickness** – 1/2" mild steel
- **Plasma Supply** – HPR400XD
- **Current** – 130 amps
- **Cut Rate** – 80"/min
- **Cut Time** – 104 sec
- **(2) 1/2" Bolt Holes**
- **"Fine-Features"**
- **True Hole®**



Rectangular 4" x 7" x 3/16" Tube

- **Thickness** – 3/16" wall mild steel
- **Tube Size** – 4" x 7" x 3/16"
- **Power Supply** – HPR130XD
- **Current** – 130 amps
- **AKS "tube-kut"**
- **AKS "robo-kut"**
- **Cut Rate** – 190"/min
- **Cut Time** – 3 mins, 45 sec



Round 8" Pipe

- **Thickness** – 3/8" wall mild steel
- **Diameter Pipe** – 8" Sch40
- **Plasma Supply** – HPR260XD
- **Current** – 130 amps
- **AKS "tube-kut"**
- **AKS "robo-kut"**
- **Cut Rate** – 110"/min
- **Cut Time** – 88 sec



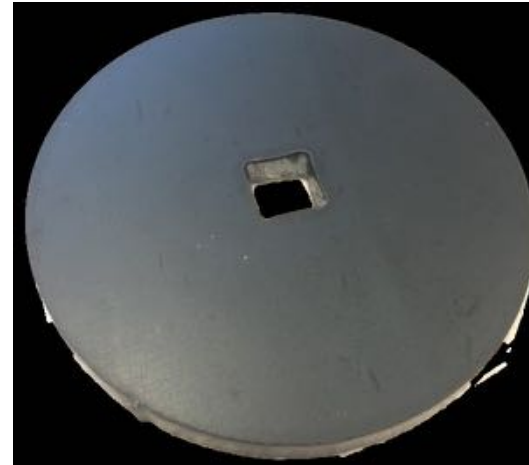
Plasma Marking

- **Thickness** – 1/2" Mild Steel
- **Plasma Supply** – HPR400XD
- **Current** – 130 amps
- **Plasma Gas** – O₂
- **Shield Gas** – Air
- **Cut Rate** – 80"/min
- **Cut Time** – 72 s (including marking)
- **1/2" bolt hole with True Hole®**
- **5/8" bolt hole with True Hole®**



Square Hole

- **Material** – domed mild steel
- **Thickness** – 1/4"
- **Diameter** – 5.5" with 1/2" square hole
- **Plasma Supply** – HPR130XD
- **Current** – 130 amps
- **AKS "robo-kut"**
- **Cut Rate** – 150"/min
- **Cut Time** – 14 sec
- **True Hole®**



Dome/Head Cutting

- **Thickness** – 1” mild steel
- **Dome Size** – 10 ft dia, 22” height
- **Power Supply** – HPR400XD
- **Current** – 400 amps
- **AKS “robo-kut”**
- **Cut Rate** – 85”/min
- **Cut Time** – 1 min for 5 holes



GREAT APPLICATION FOR “robo-kut”

3/4" thick mild steel

- **Material** – mild steel
- **Thickness** – 3/4"
- **Power Supply** – HPR260XD
- **Current** – 260 amps
- **AKS “robo-kut”**
- **30° Bevel Cut** – complete perimeter, on both sides, without WIND-UP
- **Cut Rate** – 90"/min
- **Cut Time** – 2 mins, 10 sec



1/2" Stainless Steel

- **Material** – Stainless Steel
- **Thickness** – 1/2"
- **Plasma Supply** – HPR260XD
- **Plasma Gas** – H35 and N₂
- **Shield Gas** – N₂
- **Cut Rate** – 65"/min
- **Cut Time** – 34 s
- **(2) Bolt Holes** – 1" dia



1/2" Aluminum

- **Material** – Aluminum
- **Thickness** – 1/2"
- **Plasma Supply** – HPR260XD
- **Plasma Gas** – H35
- **Shield Gas** – N₂
- **Cut Rate** – 190"/min
- **Cut Time** – 25 s
- **(2) Bolt Holes** – 1" dia



Plasma vs Waterjet vs Laser

1" Mild Steel

Plasma 400XD



Cut Rate = 85"/min

Waterjet 90ksi



Cut Rate = 8.5"/min

Laser 6000w



Cut Rate = 24"/min

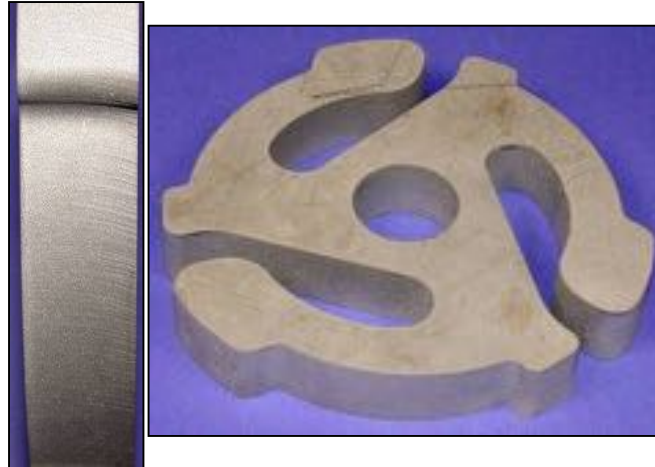
Plasma vs Waterjet vs Laser

3/4" Stainless Steel

Plasma 260XD

Waterjet 90ksi

Laser 6000w



Cut Rate = 55"/min

Cut Rate = 11.6"/min

Cut Rate = 20"/min

Plasma vs Waterjet vs Laser

1/2" Aluminum

Plasma 130XD



Cut Rate = 55"/min

Waterjet 90ksi



Cut Rate = 46"/min

Laser 6000w



Cut Rate = 32"/min

Documentation/Support





A TRADITION IN EXCELLENCE FOR OVER 100 YEARS

*Call us at 216-267-1818
or visit www.akscutting.com*

